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tions every year. Moreover, San Francisco where the number of health seekers is comparatively small, shows a contrast from season to season practically the same as at Los Angeles. I do not feel sure how to explain this. It looks, however, as if the variable climate of the east causes people to become comparatively resistant to changes of temperature, while the uniform climate of the Pacific coast although delightful in itself, causes people to lose the power of resistance and hence to succumb quickly under adverse conditions. In table 5 localities are arranged according to the variability of their climates. The range between the highest and lowest death rates for the year is least in New York where the climate is most variable, and greatest in Los Angeles where the climate is most uniform.

THE PARALLAX OF THE PLANETARY NEBULA N. G. C. 7662

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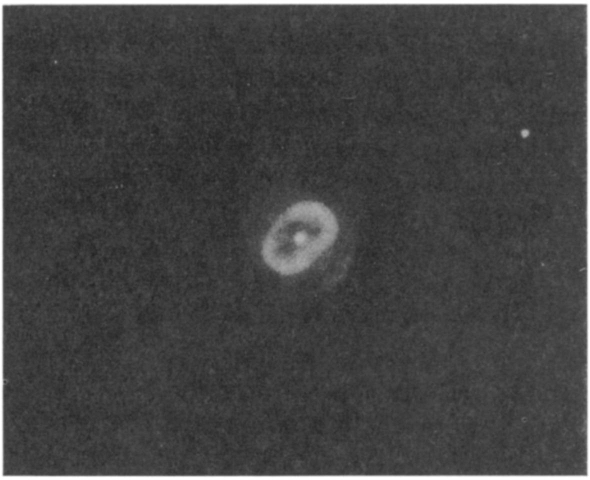
Communicated by G. E. Hale, December 24, 1916

The first results for the determination of stellar parallaxes obtained with the 80-foot focus arrangement of the 60-inch reflector were communicated to these PROCEEDINGS about two years ago.[1] The promising outcome of that investigation was fully confirmed by later results; the small probable error and the apparent absence of large systematic errors showed the desirability of extending the work to some of the nebulae. The parallaxes available for these interesting bodies are as yet extremely rare and the few existing results are far from trustworthy. For instance, about half a dozen determinations for the large spiral nebula in Andromeda have been published, the results ranging from $-0''.32 \pm 0''.12$ to $+0''.171 \pm 0''.051$[2].

Six nebulae were accordingly added to the Mount Wilson parallax program. In most cases the necessary exposure times are considerable and for several fields the work cannot be finished for some time. The planetary nebula N.G.C. 7662 (=H IV 18 Andromedae), which has a sharp stellar nucleus, gives good measurable images in a 25 minutes exposure (see Plate). Sixteen exposures were secured, the details of which are given in table 1. The successive columns contain the plate number, the date, the hour angle in degrees, the initials of the observer (H = Hoge, vM = van Maanen), the quality of the plates, the parallax-factor, the factor for annual proper motion, and finally some remarks.

The plates were measured with the monocular arrangement of the stereocomparator and reduced in exactly the same way as described in *The Photographic Determination of Stellar Parallaxes with the 60-inch Reflector.*[3] The eight pairs of plates with the necessary details are



N. G. C. 7662. PHOTOGRAPHED WITH THE 80-FOOT FOCUS ARRANGEMENT OF THE 60-INCH REFLECTOR, NOVEMBER 4, 1915. EXPOSURE 30 MINUTES, SEED 23 PLATE. SCALE 1 MM. = 1″.6; ENLARGEMENT FROM ORIGINAL NEGATIVE, 5.3 DIAMETERS.

TABLE 1

N. G. C. 7662		$\alpha = 23^h21^m6^s$			$\delta = 41°59'$ (1900)		
Plate No.	Date	t	Obs.	Qy.	p	m	Remarks
	1915						
749	November 2	− 7°.7	vM	f	−0.699	+0.84	Hazy, 30^m exp.
750	2	+ 3.0	H	fg	−0.699	+0.84	Hazy, 30^m exp.
758	4	−13.2	H	fg	−0.719	+0.85	30^m exp. trail of Boss 6602
759	4	− 2.7	vM	fg	−0.719	+0.85	30^m exp.
	1916						
1050	July 23	− 5.7	H	f	+0.701	+1.56	
1061	August 3	−14.2	H	f	+0.574	+1.59	
1062	3	− 7.0	vM	f	+0.574	+1.59	
1063	3	+ 1.2	H	f	+0.574	+1.59	
1079	5	− 6.5	H	fg	+0.549	+1.60	
1080	5	0.0	vM	fg	+0.549	+1.60	
1081	5	+ 8.2	H	g	+0.549	+1.60	
1082	5	+15.0	vM	g	+0.549	+1.60	
1126	October 21	0.0	vM	f	−0.575	+1.81	
1127	21	+ 8.7	H	fg	−0.575	+1.81	30^m exp.
1143	November 16	+ 4.5	vM	g	−0.822	+1.88	Clouds, 28^m exp.
1163	17	− 5.5	H	fg	−0.827	+1.88	Hazy, 35^m exp.

given in table 2, whose successive columns contain the plate numbers of the pair, the difference in the parallax-factors, the difference in the factors for annual proper motion, the result of the measures (in 0.0005 of a revolution of the micrometer screw as unit), the residuals, and the difference in the hour angles.

Eight comparison stars were used; Table 3 gives their brightness, their co-ordinates in right ascension and declination, and their relative parallaxes with the probable errors of these parallaxes.

TABLE 2

MOR.-EV.	Δp	Δm	M	v	Δt
1061- 758	+1.29	+0.74	+29	+15	−1°.0
1062- 749	+1.27	+0.75	+ 3	−11	+0.7
1079-1163	+1.38	−0.28	+13	− 6	−1.0
1050- 759	+1.42	+0.71	+20	+ 3	−3.0
1080-1126	+1.12	−0.21	+ 8	− 6	0.0
1063- 750	+1.27	+0.75	+10	− 4	−1.8
1081-1143	+1.37	−0.28	+31	+13	+3.7
1082-1127	+1.12	−0.21	+10	− 4	+6.3

TABLE 3

COMP. STAR	*Br*	x	y	π	P. E.
1	bf	+0′.7	+0′.4	+0″.019	±0″.010
2	bf	+4.1	+2.1	− 3	6
3	f	+2.9	−2.3	− 2	9
4	f	+1.5	−2.2	− 11	8
5	f	−0.5	−3.3	+ 11	7
6	f	−2.3	−1.8	− 1	14
7	f	−3.0	+2.5	− 24	9
8	bf	−2.9	+5.1	+0.014	±0.005

The material in Table 2 gives the following normal equations for the determination of the parallax of the nebula:

$$+2.41\mu_\alpha + 2.61\pi = +28$$
$$+2.61\mu_\alpha + 13.18\pi = +161$$

From these

$$\pi_{\text{rel.}} = +12.7 = +0''.021 \pm 0''.004$$
$$\mu_\alpha = -2.1 = -0''.003 \pm 0''.008$$

Only one other determination of the parallax of this nebula is available, viz., that by Wilsing.[4] His material comprised 31 plates, taken with the 80-cm. photographic refractor at Potsdam. His conclusion was that the parallax of N.G.C. 7662 cannot be larger than 0″.1 or 0″.2.

Huss, rediscussing this material[5] derived a parallax of $-0''.063 \pm 0''.050$. It should be remarked that on most plates Wilsing measured, not the nucleus, but the whole nebula, which has a diameter of about $26''$.

Professor Barnard has stated,[6] that the central star of the nebula is variable "to an extent upwards of three magnitudes; at times it has appeared as a bright yellowish star of about the 12th magnitude." The star appears to have practically the same magnitude on all my plates, varying from equality with comparison star 1 to a trifle brighter than comparison star 2. The visual magnitude of comparison star 1 is given by Barnard as 12.6.

To derive the absolute parallax of the nebula we must add approximately $0''.002$ to the value given above; the resulting parallax of $+0''.023$ would place the nebula at a distance of about 140 light-years. As the angular diameter of the whole nebula is about $26''$, its linear diameter would thus be of the order of nineteen times that of the orbit of Neptune.

These results seem to be extremely promising and the program will accordingly be enlarged.

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[1] Maanen, A. van, these PROCEEDINGS, **1**, 1915, (187–189).

[2] Bigourdan, G., *Bul. Astr.*, *Paris*, **26**, 1909, (331).

[3] Maanen, A. van, *Mt. Wilson Contrib.*, No. 111, 1916, (1–33).

[4] Wilsing, J., *Astr. Nachr.*, *Kiel*, **136**, 1894, (349–352).

[5] Huss, E., *Ibid.*, **178**, 1908, (95–98).

[6] Barnard, E. E., *London*, *Mon. Not. R. Astr. Soc.*, **68**, 1908, (465).

ADULT HYMENOPTEROUS PARASITES ATTACHED TO THE BODY OF THEIR HOST

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Entomophagous parasites exhibit many remarkable adaptations which enable them more easily to locate the hosts necessary for the development of their young. Most of them depend upon the acuteness of their senses and we find consequently that they are usually very active and commonly exhibit complicated instincts to aid them in their search. Many forms deposit their eggs directly within or upon the bodies of their host, seeking either the eggs or the larvæ of the host for this purpose. When oviposition in larvæ occurs, it is necessary of course that these be located by the parasites after they have attained the requisite size. When the eggs of the parasites are placed within the eggs of the host, the latter must be located soon after they have